

A TAXONOMIC TREATMENT OF  
THE GENUS Panicum (POACEAE) IN MISSISSIPPI

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Abstract

A taxonomic treatment of 40 species and 24 varieties of Panicum (Poaceae) occurring naturally or naturalized in Mississippi is presented. Fifteen species and five varieties belong in subgenus Panicum and 25 species and 19 varieties belong in subgenus Dichantherium. This treatment includes taxonomic keys, brief mention of habitat and distribution, recent nomenclature in major manuals, major references and some notes.

Introduction

This taxonomic treatment of the grass genus Panicum was prepared for the proposed Guide to the Flora of Mississippi; the format and abbreviated descriptions of taxa conform to the guidelines for contributors to this floristic project.

The taxonomy of these grasses, particularly those in the subgenus Dichantherium, is difficult partly because of extensive gene exchange among taxa and because of widespread cleistogamy in addition to chasmogamy. This unusual breeding system often results in an intricate pattern of morphological variations among taxa and obscures interspecific boundaries (Hitchcock and Chase 1910; Lelong 1965; Freckmann 1967; Spellenberg 1975). It is therefore not surprising that students of this perplexing genus have often disagreed on the delimitation and status of taxa recognized within the group.

Nearly 150 species and varieties of Panicum were ascribed to the Southeastern United States by Hitchcock and Chase (1910) in their impressive monograph of the North American taxa of this genus. They recognized 3 subgenera of Panicum: the subgenus Paurochaetium with 6 species, the subgenus Eupanicum with 81 species, and the subgenus Dichantherium with 191 species. The species in their subgenus Paurochaetium have since been transferred by most recent authors to the genus Setaria. Their diverse subgenus Eupanicum includes annual and perennial plants with basal leaves essentially similar to cauline leaves and predominantly fertile spikelets. Subgenus Dichantherium includes perennial grasses often forming a more or less extensive winter rosette of short, broad blades usually different from cauline blades; they often produce numerous dense fascicles of short axillary branches with reduced leaves and panicles late in the growing season after maturation of the large terminal panicles produced in the spring.

Spikelets of the vernal panicles are often chasmogamous and sterile whereas those of the reduced autumnal axillary panicles are primarily autogamous or cleistogamous and often fertile.

Lowe (1921) listed 69 species of Panicum for Mississippi. Four of those species have since been transferred to the genera Echinochloa, Sacciolepis, and Leptoloma; nine additional species have been reduced to synonyms by most recent authors. Therefore 56 species of Panicum are included in Lowe's work: 18 species in subgenus Panicum and 38 in subgenus Dichantherium. Small (1933) followed essentially the taxonomic treatment of Panicum in Hitchcock and Chase (1910); he recognized 117 species for the Southeastern States, including 31 species in subgenus Panicum and 86 in subgenus Dichantherium. Small noted the occurrence of 84 species of Panicum in Mississippi, 22 in subgenus Panicum and 62 in subgenus Dichantherium. Hitchcock (1951) ascribed 80 species and 6 varieties of Panicum to Mississippi; 21 species and 2 varieties in subgenus Panicum, and 59 species and 4 varieties in subgenus Dichantherium. Most recent authors of floras dealing with Southeastern plants have recognized fewer taxa of Panicum than Hitchcock and Chase, reducing many species to the varietal rank and including others in synonymy. This useful trend was primarily initiated by Radford (Radford et al., 1964) and pursued by Correll and Johnston (1970) and others. In 1984, I proposed 22 new varietal combinations for Panicum of southeastern United States.

In 1974, Gould elevated subgenus Dichantherium to the generic level primarily on the basis of morphological differences and also because species of Dichantheria studied exhibit the "non-Kranz" type leaf anatomy and the  $C_3$  photosynthetic pathway while most of the species in subgenus Panicum have the Kranz-type leaf anatomy with  $C_4$  photosynthesis (Smith, B.N. and W.V. Brown, 1973). However, morphological differences between species of the two subgenera are often not consistently sharp and become even less distinct in the Tropics; also, as noted by many botanists, the two types of leaf anatomy and of photosynthetic pathways occur occasionally within other well defined and presumably fairly "natural" angiosperm genera. Therefore, it seems preferable at present to maintain the genus Panicum essentially as defined by Hitchcock (1950) after transfer of a few of their species to better defined genera such as Setaria, Paspalidium, and Brachiaria. Gould and Clark (1978) published a taxonomic treatment of the genus Dichantherium occurring in the United States and Canada. A total of 45 taxa including 26 species and 19 varieties were recognized by them for the Southeastern States; 17 species and 13 varieties for Mississippi.

In the present treatment, 40 species and 24 varieties of Panicum are treated, including 15 species and 5 varieties in subgenus Panicum and 25 species and 19 varieties in subgenus Dichantherium. Reference is made to synonyms used in major recent manuals treating the plants of the Eastern United States: Small (1933) indicated by S; Fernald (1950) indicated by F; Gleason and Cronquist (1963) indicated as G; and Radford, Ahles and Bell (1968) indicated by R. Reference is also made to synonyms recognized in

the most recent major treatment of North American *Dichantherium* by Gould and Clark (1978). Other comprehensive recent works which were consulted in the preparation of this treatment are those of Correll and Johnston (1970), Gould (1975), Godfrey and Wooten (1979) and Allen (1980). County distribution is based primarily on the examinations of Mississippi specimens in numerous herbaria of Southeastern United States including MISS, MISSA, UNA, AUA, NCU, FSU, GA. The invaluable help of curators in charge of those and other collections consulted is gratefully acknowledged.

The 10 physiographic regions of Mississippi recognized in Lowe (1921) are abbreviated in the text as follows: Tennessee River Hills, TRH; Northeastern Prairie Belt, NPB; Pontotoc Ridge, PR; Flatwoods, FW; North Central Plateau, NCP; Jackson Prairie, JP; Loess Bluff, LBH; Yazoo-Mississippi Delta, YMD; Longleaf Pine Region, LPR; and Coastal Plain Meadows, CPM.

#### Key to the species of *Panicum* of Mississippi

- Plant annual or perennial, without an overwintering basal rosette of leaves or a dense overwintering basal cushion of leaves. (Mostly subgenus *Panicum*) . . . . . Key 1.  
 Plant perennial producing an overwintering rosette of leaves with short, wide blades unlike cauline blades or a dense overwintering basal cushion of leaves. (Subgenus *Dichantherium*) . . . . . Key 2.

#### Key 1

1. Plant annual.
  2. Spikelets verrucose or tuberculate.
    3. Spikelets 1.7-2.2 mm long, glabrous . 13. *P. verrucosum*.
    3. Spikelets 3.3-3.9 mm long, pubescent . . . . . 14. *P. brachyanthum*.
  2. Spikelets not verrucose nor tuberculate.
    4. Fertile floret transversely rugose.
      5. Spikelets 5-6 mm long . . . . . *Brachiaria texana*.
      5. Spikelets 3.1-3.6 mm long . . . . . *Brachiaria ramosa*.
    4. Fertile floret smooth and shiny.
      6. Spikelets 5.5-7 mm long, subsecund on few stiffly ascending panicle branches . . . . 15. *P. gymnocarpon*.
      6. Spikelets less than 5.5 mm long, on numerous flexuous or contracted panicle branches.
        7. Sheaths glabrous . . . . . 1. *P. dichotomiflorum*.
        7. Sheaths more or less densely papillose-pubescent.
          8. Spikelets 4.5-5.5 mm long . . . 4. *P. miliaceum*.
          8. Spikelets 1.7-3.5 mm long.
            9. Spikelets 2.7-3.5 mm long; primary panicle about 1/2 as broad as long or less . . . . . 3. *P. flexile*.
            9. Spikelets 1.7-2.5 mm long; primary panicle usually more than 1/2 as long 2. *P. capillare*.
  1. Plant perennial.

10. Panicle narrow, usually less than 2 cm broad with few subsessile spikelets.
11. Culm wiry, often purplish; blades 1.5-4 mm wide, involute . . . . . 7. P. tenerum.
11. Culm coarse; blades 5-20 mm wide, flat . . . . . 8. P. hemitomon.
10. Panicle more than 2 cm broad with numerous spikelets on long or short pedicels.
12. Spikelets 5.5-7 mm long; culm decumbent and stoloniferous . . . . . 15. P. gymnocarpon.
12. Spikelets less than 5.5 mm long (except sometimes in P. amarum); culm rhizomatous or tufted.
13. Sterile palea greatly inflated and indurate at maturity; culm slender, densely tufted 9. P. hians.
13. Sterile palea unexpanded at maturity; culm more or less robust, tufted, clumped or solitary.
14. Plant with stout, elongate, scaly rhizomes, often in large clumps or extensive colonies; culms and sheaths terete.
15. Spikelets subsessile and subsecund, up to 3.9 mm long, often gaping, falcate and obliquely set on short appressed pedicels . . . . . 6. P. anceps.
15. Spikelets not as above, up to 6.5 mm long, usually on long pedicels.
16. Spikelets 2.2-2.8 mm long; first glume often subtruncate, rounded or broadly acute . . . . . 12. P. repens.
16. Spikelets 2.8-6.5 mm long, often gaping at apex; first glume acuminate, acute or beaked.
17. Panicle open, diffuse; spikelets usually 3-5 mm long . 10. P. virgatum.
17. Panicle contracted with appressed branches; spikelets 4-6.5 mm long . . . . . 11. P. amarum.
14. Plant with short, hard, knotty bases or caudexes, often densely tufted; culms and sheaths more or less strongly compressed . . . . . 5. P. rigidulum.

## Key 2

1. Plant forming dense basal cushion of leaves by extensive branching from basal nodes and lack of elongation of lower internodes; the few cauline blades similar to the basal ones.
2. Basal blades elongate, linear, fairly rigid, suberect, up to 20 cm long and 5 cm wide, usually more than 20 X as long as wide . . . . . 16. P. depauperatum.
2. Basal blades pale green, narrowly lanceolate, thin, spreading to suberect, up to 15 cm long and 12 mm wide, usually less than 20 X as long as wide.

3. Sheaths with fine, long, spreading or retrorse hairs; spikelets 1.7-2.3 mm long, pustulose-pubescent . . . . . 17. *P. laxiflorum*.
3. Sheaths glabrous or puberulent; spikelets 1.1-2.1 mm long, glabrous, puberulent or pubescent.
  4. Spikelets 1.1-1.5 mm long, glabrous or puberulent; blades 1-4 mm wide, often involute with whitish cartilaginous margins . . . . . 30. *P. chamaelonche*.
  4. Spikelets 1.1-2.1 mm long, glabrous or pubescent; blades 3-8 mm wide, flat, glabrous or pilose, margins papillose-ciliate to middle of blade or beyond . . . . . 18. *P. strigosum*.
1. Plant forming a distinct overwintering rosette of short, broad blades, usually unlike cauline blades, branching at least somewhat from upper nodes; lower internodes usually elongating.
  5. Spikelets 0.8-1.9 mm long.
    6. Vernal blades narrow, seldom over 4 mm wide; plant eventually branching profusely and forming dense tufts; autumnal blades often more or less involute and pointed.
      7. Spikelets 1.7-2.2 mm long; autumnal blades greatly reduced, stiff, prominently nerved, strongly involute and often arcuate . . . . . 23. *P. aciculare*.
      7. Spikelets 1.1-1.5 mm long; autumnal blades slightly reduced, thickish, somewhat involute, with whitish margins . . . . . 30. *P. chamaelonche*.
    6. Vernal blades over 4 mm wide; plant usually not forming dense tufts with age (except occasionally in *P. acuminatum*).
      8. Ligules actually or apparently 1-5 mm long.
        9. Spikelets 0.8-1.1 mm long; ligules 1.5-3 mm long . . . . . 31. *P. wrightianum*.
        9. Spikelets 1.1-1.9 mm long; ligules 0.2-5 mm long.
          10. Blades small, 1.5-3.5 cm long, 1-4 mm wide, often spreading; ligules 0.2-1.5 mm long . . . . . 29. *P. ensifolium*.
          10. Blades up to 10 cm long and 10 mm wide; vars. with narrow leaves have erect or ascending blades; ligules 1-5 mm long . 32. *P. acuminatum*.
      8. Ligules less than 1 mm long.
        11. Spikelets subspherical to broadly ellipsoid, puberulent; blades 4-25 mm wide, broadly cordate to subcordate at base.
          12. Spikelets 1.1-1.4 mm long; cauline blades 4 to 7, 5-10 mm wide . . . 22. *P. erectifolium*.
          12. Spikelets 1.3-1.8 mm long; cauline blades seldom more than 4; if more than 4, then 4-25 mm wide.
          13. Cauline blades usually less than 4, 4.5-10 cm long and 5-14 mm wide . . . . . 20. *P. sphaerocarpon*.

13. Cauline blades usually more than 4,  
10-23 cm long and 14-25 mm wide  
. . . . . 21. P. polyanthes.
11. Spikelets ellipsoid to obovoid, glabrous or  
pubescent; blades 3-14 mm wide, tapering,  
strangled or rounded at base.
14. Culms slender, weak, seldom over 4 dm tall;  
blades small, up to 3.5 cm long and 4 mm wide,  
thin, spreading or reflexed . 29. P. ensifolium.
14. Culms stiffer, often wiry, usually over 4 dm  
tall; blades longer and wider, firm or thin,  
ascending to spreading or reflexed.
15. Spikelets asymmetrically pyriform; cauline  
blades 4 or more, stiffly spreading  
. . . . . 26. P. portoricense.
15. Spikelets ellipsoid to obovoid; cauline  
blades 3 to 4 and ascending; if more than  
4, then soft and spreading to ascending.
16. Plant small up to 4.5 dm tall; blades  
mostly basal, few cauline blades short,  
to 8 mm wide, conspicuously papillose-  
ciliate; spikelets obovoid to broadly  
ellipsoid, 1.1-2.1 mm long . 18. P. strigosum.
16. Plant larger up to 10 dm tall; blades  
primarily cauline or crowded at base  
and with 3 to 4 cauline blades (in  
P. tenue); spikelets mostly ellipsoid  
or obovoid, 1.3-2.7 mm long.
17. Blades usually soft, 4-14 cm long,  
3-14 mm wide; spikelets ellipsoid  
to obovoid, glabrous or pubescent,  
1.5-2.7 mm long . . . . 27. P. dichotomum.
17. Blades stiffly ascending, conspicu-  
ously white-margined, 2-5 cm long,  
1.5-6 mm wide; spikelets ellipsoid,  
1.3-1.7 mm long . . . . . 28. P. tenue.
5. Spikelets 1.9-4.7 mm long.
18. Spikelets 1.9-3.2 mm long.
19. Cauline blades distinctly cordate at base,  
often over 11 mm wide.
20. Plant densely and softly pubescent throughout  
with densely bearded nodes and glabrous  
glandular rings just below nodes . 34. P. scoparium.
20. Plant mostly glabrous or sparsely pubescent or  
puberulent; nodes glabrous or sparsely pubescent.
21. Plant robust often more than 7 dm tall;  
sheaths, at least the lower or the axillary  
ones papillose-hirsute, papillose-pilose or  
papillose; blades usually more than 10 cm  
long . . . . . 39. P. clandestinum.
21. Plant usually less than 7 dm tall; sheaths  
glabrous, finely pubescent or puberulent;

- blades usually less than 10 cm long  
 . . . . . 37. P. commutatum.
- 19. Culine blades rounded or tapering at base, seldom over 11 mm wide (except in P. scabriusculum).
- 22. Leaf blades elongate, linear, usually more than 14 X as long as wide, often ascending or erect.
- 23. Blades thick, often striate above and pleated beneath, tapering from base to apex and usually pubescent underneath.
- 24. Nodes bearded; plant densely grayish pubescent throughout . . . . . 25. P. consanguineum.
- 24. Nodes not bearded; plant glabrous or sparsely papillose-pilose.
- 25. Spikelets 1.7-2.2 mm long; blades 3.5-8 cm long and up to 4 mm wide . . . . 23. P. aciculare.
- 25. Spikelets 2.4-2.9 mm long; blades 5-15 cm long and up to 7 mm wide . . 24. P. angustifolium.
- 23. Blades thin, not striate or pleated, usually widest near the middle, essentially glabrous 19. P. nudicaule.
- 22. Leaf blades wider, often lanceolate, usually 10 X as long as wide or less.
- 26. Leaves mostly basal, thin, culine blades seldom more than 3, often ascending, uppermost greatly reduced; uppermost internode greatly elongate.
- 27. Spikelets 1.1-2.1 mm long, broadly ellipsoid, pubescent; blades long papillose-ciliate  
 . . . . . 18c. P. strigosum.  
 var. leucoblepharis.
- 27. Spikelets 2.4-2.9 mm long, narrowly ovate or ellipsoid, glabrous, acuminate . . 19. P. nudicaule.
- 26. Leaves mostly culine, relatively thick, usually more than 8 per culm, spreading to ascending or reflexed, uppermost usually not greatly reduced (except in P. acuminatum var. unciphyllum); uppermost intermode not greatly elongate.
- 28. Hairs of ciliate ligules 1.5-5 mm long.
- 29. Spikelets 1.1-1.9 mm long, seldom longer  
 . . . . . 32. P. acuminatum.
- 29. Spikelets 2-2.4 mm long.
- 30. Sheaths densely to sparsely pilose with fine spreading to ascending hairs up to 4 mm long; spikelets 2-3 mm long 33. P. ovale.
- 30. Sheaths glabrous or papillose-hispid with stiff ascending hairs less than 2 mm long; spikelets 2.7-4.2 mm long 35. P. oligosanthus.
- 28. Hairs of ciliate ligules less than 1.5 mm long or ligules not ciliate.
- 31. Plant robust, 7-14 dm tall; blades large, elongate, 12-25 cm long; ligule membranous, erose, less than 1 mm long . . . . . 38. P. scabriusculum.
- 31. Plant usually less than 7 dm tall or if more, with retrorsely bearded nodes; blades usually less than

- 12 cm long; ligules ciliate or obsolete.
- 32. Culms sparsely ascending-pilose or strigose; nodes appressed-pilose; blades mostly ascending, stiff, often with conspicuous white scaberulous margins . . . . . 33. P. ovale.
- 32. Culms glabrous or puberulent, often wiry and purple; blades often spreading to reflexed or ascending, thin, usually without white margins.
- 33. Spikelets 2.7-3.5 mm long, obovoid; sheaths papillose-hispid or papillose-pilose . . . . . 35. P. oligosanthos.
- 33. Spikelets 1.5-2.7 mm long, ellipsoid or asymmetrically obovoid; sheaths glabrous or puberulent.
- 34. Culms and nodes wiry, often purple and densely puberulent, up to 5 dm tall; spikelets asymmetrically pyriform or broadly obovoid, pustulose-puberulent to subglabrous . . . . . 26. P. portoricense.
- 34. Culms and nodes robust to weak, usually glabrous, up to 10 dm tall; spikelets mostly ellipsoid or obovoid, glabrous or sparsely pubescent . . . . . 27. P. dichotomum.
- 18. Spikelets 3.2-4.7 mm long.
- 35. Spikelets more than 3.7 mm long.
- 36. Blades broadly cordate at base, 10-35 mm wide.
- 37. Sheaths usually glabrous or softly papillose-pilose or puberulent; nodes densely bearded with long, retrorse hairs . . . . 40. P. boscii.
- 37. Sheaths densely papillose-hispid or papillose-pilose; nodes bearded with short, tangled hairs . . . . . 36. P. ravenelii.
- 36. Blades rounded, tapering at base or subcordate, 5-15 mm wide . . . . . 35. P. oligosanthos.
- 35. Spikelets less than 3.7 mm long.
- 38. Ligules ciliate 1-3 mm long; blades usually less than 10 mm wide . . . . . 35. P. oligosanthos.
- 38. Ligules ciliate, erose or obsolete, less than 1 mm long; blades usually 10-35 mm wide.
- 39. Sheaths at least the lowermost and the axillary ones papillose-hispid or papillose-pilose . . . . . 39. P. clandestinum.
- 39. Sheaths glabrous, sparsely pilose or puberulent . . . . . 37. P. commutatum.

1. P. dichotomiflorum Michx., Fall Panicum. May-Oct. Mostly moist, open, disturbed areas; marshy shores, roadside ditches, low waste areas and fields; common throughout. Incl. P. dichotomiflorum var. geniculatum (Wood) Fernald--F.G.

2. P. capillare L. Witchgrass. June-Oct. Open, disturbed,

often moist areas such as sand bars, fields and waste places; chiefly YMD, also NPB, FW (Oktibbeha Co.) and LPR (George Co.).

3. *P. flexile* (Gattinger) Scribner. Sept.-Oct. Moist, open, calcareous areas, limestone outcrops, prairies, uncommon; NPB (Lowndes Co.), FW (Oktibbeha Co.), NCP (Scott Co.), JP (Jasper Co.).

4. *P. miliaceum* L. Broomcorn Millet. July. Waste place; this cultivated eurasian grass rarely escapes from cultivation, Pearl River Co.

5. *P. rigidulum* Bosc ex Nees.

1. Blades usually 5-12 mm wide, flat, mostly glabrous; ligules membranous, 0.3-1 mm long.
2. Spikelets 1.6-2.5 mm long, over 0.6 mm wide, green or purplish-tinged . . . . . 5a. var. rigidulum.
2. Spikelets 2.4-3 mm long, less than 0.6 mm wide, stipitate, usually purple . . . . . 5b. var. elongatum.
1. Blades usually 2-7 mm wide, often involute, pilose above at least near base; ligules membranous, usually fimbriate-ciliate, 0.5-3 mm.
3. Spikelets 2-2.7 mm long, green or purplish-stained, often obliquely set on pedicels . . . 5c. var. pubescens.
3. Spikelets 2.6-3.7 mm long, usually purple and slender, erect on pedicels . . . . . 5d. var. combsii.

5a. *P. rigidulum* var. rigidulum. July-Oct. Marshes, low woods, wet meadows, borders of streams, lakes and ponds, ditches and other wet or moist places; common throughout. *P. agrostoides* Spreng.--S; *P. agrostoides* Spreng. var. *agrostoides*--F,G,R; *P. condensum* Nash--S; *P. agrostoides* var. condensum (Nash) Fern.--F,R; *P. agrostoides* var. ramosius (Mohr) Fern.--F.

5b. *P. rigidulum* var. elongatum (Scribner) Lelong. July-Oct. Same habitats as 5a; this predominantly northern var. doubtfully occurs in the State; reported for Lawrence and Stone Cos. *P. stipitatum* Nash--S,F,R; *P. agrostoides* Spreng. var. elongatum Scribn.--G.

5c. *P. rigidulum* var. pubescens (Vasey) Lelong. July-Oct. Pine savannahs, bogs, ditches and other moist, open, sandy areas; LPR and CPM. *P. longifolium* Torr.--S; *P. longifolium* Torr. var. longifolium--F,G,R; *P. longifolium* var. pubescens (Vasey) Fern.--F.

5d. *P. rigidulum* var. combsii (Scribner & Ball) Lelong. Sept.-Oct. Marshes, shores of lakes and ponds; rare, Harrison Co. *P. combsii* Scribn. & Ball--S; *P. longifolium* Torr. var. combsii Fern.--F,G,R.

6. *P. anceps* Michaux. June-Oct. Primarily moist sandy areas such as low woods, pine savannahs, fields and ditches,

occasionally on drier sites. Most specimens conform to var. anceps which has falcate spikelets 2.7-3.9 mm long and is common throughout the state. Var. rhizomatum (Hitchc. & Chase) Fern. has spikelets 2.3-2.8 mm long and longer, more slender rhizomes. It occurs chiefly in low pinelands, savannahs and bogs near the coast; LPR, CPM. P. rhizomatum Hitchc. & Chase--S.

7. P. tenerum Beyrich in Trinius. June-Oct. Wet or moist, open, sandy soil, cypress-gum ponds, bogs near the coast, LPR, CPM, George, Harrison and Jackson Cos.

8. P. hemitomon Schultes. Maidencane. May-July. Marshy shores of lakes and ponds, stream banks, ditches, often in shallow water; LPR, CPM, Forrest and Jackson Cos.

9. P. hians Elliott. May-Oct. Wet to moist soil along ponds and streams, marshes, ditches, seldom on drier sites; throughout.

10. P. virgatum L. Switchgrass. June-Oct. Mostly moist, open areas such as fresh-water or brackish marshes, shores of ponds and streams, and savannahs; also drier sites such as open woodlands, prairies and dunes; throughout. Incl. P. virgatum var. cubeense Griseb.--S,F. This common grass is quite variable. Smaller plants with spikelets about 3 mm long are recognized by some as var. cubeense; robust specimens with congested panicles and spikelets up to 5.5 mm long intergrade somewhat with the coastal P. amarum var. amarulum.

11. P. amarum Ell. July-Oct. Coastal sandy beaches, dunes and swales; CPM, Harrison and Jackson Cos. Most of our plants belong to var. amarulum (Hitchc. & Chase) Palmer (P. amarulum--S,F,G,R) with large, flexuous and densely flowered panicles and spikelets 4-5.8 mm long. The predominantly northern var. amarum has smaller panicles, usually less than 4 cm wide and spikelets 5-6.5 mm long. Palmer, P.G. 1975. A biosystematic study of the Panicum amarum-amarulum complex (Gramineae). *Brittonia* 27(2):142-150.

12. P. repens L. Torpedo grass. May-Dec. Coastal sandy beaches; sandy shores of lakes, ponds and streams, often extending onto water, roadsides, ditches, waste places; CPM, LPR, Forrest, Hancock, Jackson and Lamar Cos. Incl. P. gouini Fourn.--S, an uncommon dwarf form with small, densely flowered panicles of purplish spikelets which should possibly be recognized as a variety of this widespread grass.

13. P. verrucosum Muhl. July-Oct. Usually in moist or wet, sandy, open areas such as shores, swamp borders, low disturbed pinelands and ditches; CPM, LPR, NCP, Oktibbeha Co.

14. P. brachyanthum Steudel. Oct. Only one specimen

collected Oct. 5, 1962 by Dr. S. McDaniel in a roadside ditch 1 mi. n.w. of Ellisville, Jones Co. (LPR) was seen.

15. *P. gymnocarpon* Ell. Aug.-Oct. Muddy swamps, often in dense shade, marshy shores of streams and lakes, occasionally in shallow water; YMD, TRH (Tishomingo Co.), NPB, LPR.

Species Nos. 16-40 are placed by Hitchcock and Chase (1910, 1950) in the subgenus *Dichantherium* raised to generic level by Gould (1974). They are perennial and form an overwintering basal cushion or rosette of leaves, often quite dissimilar to cauline leaves. Most of them produce large terminal panicles in the spring and numerous smaller panicles on much reduced axillary branches the rest of the year. The bushy, fasciated appearance of these grasses in the summer and fall is often quite different from the unbranched vernal form with relatively large blades and panicles.

16. *P. depauperatum* Muhl. Dry, open woodlands, grasslands, roadsides; TRH, NPB, NCB, LPR. *Dichantherium depauperatum* (Muhl.) Gould.

17. *P. laxiflorum* Lam. Mesic or low woods, usually shady, open woods, woodland borders; throughout. Incl. *P. xalapense* HBK--S; *Dichantherium laxiflorum* (Lam.) Gould.

18a. *P. strigosum* Muhl. var. *strigosum*. Spikelets 1.1-1.7 mm long, glabrous; blades variously pubescent. Sandy pinelands, savannahs, bogs; CPM, LPR, NCP. *Dichantherium leucoblepharis* (Trinius) Gould & Clark var. *pubescens* (Vasey) Gould & Clark; *D. strigosum* var. *strigosum* Freckmann. Freckmann, R.W. 1981. The correct name for *D. leucoblepharis* and its varieties. Brittonia 33:457-458.

18b. *P. strigosum* Muhl. var. *glabrescens* (Grisebach) Lelong. Spikelets 1.1-1.9 mm long, glabrous; blades essentially glabrous. Sandy pinelands, savannahs, bogs; CPM, LPR, Jackson Co. *P. polycaulon* Nash--S; *P. strigosum* Muhl.--R, in part; *Dichantherium leucoblepharis* var. *glabrescens* (Griseb.) Gould & Clark; *P. strigosum* var. *glabrescens* Freckmann.

18c. *P. strigosum* Muhl. var. *leucoblepharis* (Trinius) Lelong. Spikelets 1.6-2.1 mm long, pubescent; blades usually glabrous. Sandy moist pinelands, savannahs, bogs; CPM, LPR, Harrison and Jackson Cos. *P. ciliatum* Ell.--S,F,R; *Dichantherium leucoblepharis* var. *leucoblepharis* Gould & Clark; *D. strigosum* var. *leucoblepharis* Freckmann.

19. *P. nudicaule* Vasey. Wet savannahs, bogs, Sphagnum mats, margins of cypress swamps; uncommon, CPM, LPR, George, Greene, Hancock, Harrison and Jackson Cos.

20. *P. sphaerocarpon* Ell. Sandy, usually open and dry

areas, woodland borders, roadsides; common throughout, possibly somewhat less common in YMD. Incl. P. sphaerocarpon var. inflatum (Scribn. & Smith) Hitchc.--F; Dichantheium sphaerocarpon (Ell.) Gould var. sphaerocarpon Gould & Clark.

21. P. polyanthes Schultes. Low woods, woodland openings, stream banks, ditches, usually in shade; throughout, most common northward. Dichantheium sphaerocarpon (Ell.) Gould var. isophyllum (Scribner) Gould & Clark.

22. P. erectifolium Nash. Moist to wet, sandy pinelands, bogs, marshes, pond margins; CPM, LPR, Jackson Co. Dichantheium erectifolium (Nash) Gould & Clark.

23. P. aciculare Desvaux ex Poiret. Dry, sandy, open pine-oak woods, cut-over woodlands, roadsides; throughout except TRH, YMD, and LBH, most common in s. part of State. Incl. P. neuranthum Griseb.--S,R; P. ovinum Scribner & Smith--S; P. arenicoloides Ashe--S; P. chrysopsidifolium Nash--S; Dichantheium aciculare (Desv. ex Poir.) Gould & Clark, in part. This taxon grades into P. angustifolium; it also approaches P. portoricense which has usually smaller spikelets, puberulent sheaths and wider puberulent blades. Allred, K.W. and F.W. Gould. 1978. Geographic variation in the Dichantheium aciculare complex (Poaceae). *Brittonia* 30:497-504.

24. P. angustifolium Ell. Dry, sandy, open pine-oak woods, clearings, roadsides, occasionally on moist sites; essentially same range as P. aciculare. Incl. P. fusiforme Hitchc.--S,F,G,R; Dichantheium aciculare (Desv. ex Poir.) Gould & Clark, in part. Occasional troublesome specimens are intermediate between this taxon and P. aciculare.

25. P. consanguineum Kunth. Low pinelands, savannahs, bogs, cut-over sandy pine woods; primarily CPM, LPR, occasionally northward NCP (Kemper Co.), Union Co. Dichantheium consanguineum (Kunth) Gould & Clark. Occasional specimens resemble closely unusually pubescent plants of the preceding species.

26a. P. portoricense Desvaux ex Hamilton var. portoricense. Spikelets 1.5-1.8 mm long, puberulent to glabrous; blades up to 5 cm long and 4.5 mm wide. Sand dunes along coast, sandy pine-oak woods, low pinelands; CPM, Jackson and Harrison cos. Dichantheium sabulorum (Lam.) Gould & Clark var. thinium (Hitchc. & Chase) Gould & Clark, in part.

26b. P. portoricense Desv. ex Hamilt. var. nashianum (Scribner) Lelong. Spikelets 1.9-2.6 mm long, rarely longer, usually densely papillose-pubescent or puberulent; blades up to 7 cm long and 8 mm wide. Same habitats and range as var. portoricense, often on moist sites. Incl. P. lancearium Trin.--S,F,G,R; P. patulum (Scribn. & Merr.) Hitchc.--S; P. lancearium var. patulum Fern.--F; P. patentifolium Nash--S; P.

webberianum Nash--S,R; Dichantherium sabulorum (Lam.) Gould & Clark var. patulum Gould & Clark, in part. This variable taxon resembles closely the preceding var. It also grades into P. commutatum through forms recognized by some as P. patentifolium. Occasional specimens conforming to P. webberianum suggest the widespread P. sphaerocarpon.

27. P. dichotomum L.

1. Blades of leaves at midculm seldom over 7 mm wide, often narrowed or constricted at base. Nodes usually glabrous or slightly pubescent.
2. Culms erect, terete.
  3. Blades usually spreading; spikelets ellipsoid, 1.8-2.3 mm long . . . . . 27a. var. dichotomum.
  3. Blades often erect or ascending; spikelets obovoid, 1.5-1.9 mm long, often purplish at base . . . . . 27b. var. roanokense.
2. Culms weak, reclining or sprawling, occasionally flattened . . . . . 27c. var. lucidum.
1. Blades of leaves at midculm usually 7-14 mm wide, usually not constricted at base or subcordate. Nodes usually densely bearded with retrorse hairs.
  4. Spikelets 1.5-1.8 mm long, usually glabrous . . . . . 27d. var. ramulosum.
  4. Spikelets 1.8-2.5 mm long, rarely longer, pubescent . . . . . 27e. var. nitidum.

27a. P. dichotomum L. var. dichotomum. Dry to mesic woods, occasionally in moist woodlands; throughout. Incl. P. barbuiatum Michx.--S; P. dichotomum var. barbuiatum Wood--F; Dichantherium dichotomum (L.) Gould var. dichotomum, in part.

27b. P. dichotomum L. var. roanokense (Ashe) Lelong. Moist to wet pinelands; rare near coast, CPM, LPR, Jackson and Perry Cos. P. roanokense Ashe--S,F,G; P. caerulescens Hack.--S,F; P. dichotomum L.--R, in small part; Dichantherium dichotomum (L.) Gould var. dichotomum, in small part. This var. exhibits features of P. sphaerocarpon, P. erectifolium and possibly also P. portoricense.

27c. P. dichotomum L. var. lucidum (Ashe) Lelong. Wet woods, swamps, bogs, margins of ponds and streams; CPM, LPR. Incl. P. Sphagnicola Nash--S; P. lucidum Ashe--S,F,G; P. lucidum var. opacum Fern.--F; P. dichotomum L.--R, in small part; Dichantherium dichotomum (L.) Gould var. dichotomum, in small part.

27d. P. dichotomum L. var. ramulosum (Torrey) Lelong. Low woods, swamps, borders of streams and ponds; throughout. P. microcarpon Muhl.--S,F; P. nitidum Lam. var. ramulosum Torr.--G; P. dichotomum L.--R, in part; Dichantherium dichotomum (L.) Gould var. dichotomum, in part.

27e. P. dichotomum L. var. nitidum (Lam.) Wood. Essentially same habitats as var. ramulosum; CPM, LPR, reportedly also in Noxubee and Oktibbeha Cos. P. nitidum Lam.--S,F,G; P. dichotomum L.--R, in small part; Dichantherium dichotomum (L.) Gould var. dichotomum, in small part. This var. which is fairly distinct in the n. part of its range intergrades largely with the preceding var. in our range.

28. P. tenue Muhl. Moist to dry, sandy, open woods, pine savannahs, bogs, disturbed sites; mostly CPM and LPR, NCP. Incl. P. albomarginatum Nash--S,F,G; P. flavovirens Nash--S; P. trifolium Nash--S,F; P. ensifolium Baldw.--G, in part; Dichantherium dichotomum var. tenue (Muhl.) Gould & Clark. This species exhibits characteristics of P. sphaerocarpon, P. dichotomum var. dichotomum and P. ensifolium.

29a. P. ensifolium Baldwin ex Ell. var. ensifolium. Sheaths glabrous; blades usually puberulent beneath and glabrous or rarely pubescent above. Moist to wet sandy, open pine woods, savannahs, bogs, Sphagnum mats; CPM, LPR. Incl. P. vernale Hitchc. & Chase--S; Dichantherium dichotomum var. ensifolium (Baldw.) Gould & Clark, in part.

29b. P. ensifolium Baldwin ex Ell. var. curtifolium (Nash) Lelong. Sheaths sparsely spreading-pilose; blades often sparsely pilose on both surfaces or glabrous. Same habitats and range as typical var. P. curtifolium Nash--S,R; Dichantherium acuminatum (Swartz) Gould & Clark var. implicatum (Scribner) Gould & Clark, in small part.

30. P. chamaelonche Trinius. Moist, open, sandy pinelands, savannahs, moist depressions in sand dunes; CPM, LPR, Green, Harrison, Jackson Cos. Incl. P. glabrifolium Nash--S; Dichantherium dichotomum var. ensifolium (Baldwin) Gould & Clark, in part; D. dichotomum var. glabrifolium (Nash) Gould & Clark, in part.

31. P. wrightianum Scribner. Low pine savannahs, bogs, margins of ponds, streams and cypress swamps; CPM, LPR, Hancock, Harrison and Jackson Cos. Dichantherium acuminatum (Swartz) Gould & Clark var. wrightianum (Scribn.) Gould & Clark.

32. P. acuminatum Swartz.

1. Culms and sheaths densely and variously pubescent.
2. Culms and sheaths densely spreading villous and often also inconspicuously puberulent beneath; blades undersurface softly pubescent 32a. var. acuminatum.
2. Culms and sheaths ascending to spreading papillose-pilose; blades densely to sparsely appressed-pilose or puberulent beneath.

3. Blades usually more than 6 mm wide, spreading, short-pilose to nearly glabrous above; spikelets 1.5-1.8 mm long . . . . . 32b. var. fasciculatum.
3. Blades usually less than 6 mm wide, ascending to retrorse, long-pilose or scattered villous above; spikelets 1.1-1.6 mm long.
4. Blades ascending, long-pilose above; spikelets 1.3-1.6 mm long, often broadly obovoid . . . . . 32c. var. unciphyllum.
4. Blades ascending to reflexed, glabrous or sparsely villous above; spikelets 1.1-1.5 mm long, ellipsoid . . . . . 32g. var. leucothrix.
1. Culms and sheaths usually glabrous, occasionally sparsely pilose, especially lowermost ones.
5. Blades often yellowish-green with long papillose cilia at base; spikelets 1.3-1.6 mm long, often obovoid . . . . . 32d. var. lindheimeri.
5. Blades often dark-green or purplish, usually less conspicuously ciliate at base; spikelets 1.1-1.9 mm long, ellipsoid.
6. Panicles narrow, congested; spikelets 1.3-1.9 mm long . . . . . 32e. var. densiflorum.
6. Panicles open; spikelets 1.1-1.5 mm long . . . . . 32f. var. longiligulatum.

32a. P. acuminatum Swartz var. acuminatum. Various habitats, especially moist, sandy, open sites, pinelands, savannahs, roadsides; throughout, especially common in s. part of State. P. lanuginosum Ell.--S,R in part; P. lanuginosum var. lanuginosum--F,G; P. auburne Ashe--S,F,G; P. thurwii Scribn. & Smith--S; Dichantherium acuminatum (Swartz) Gould & Clark var. acuminatum, in part; D. acuminatum var. thurwii (Scribn. & Smith) Gould & Clark.

32b. P. acuminatum var. fasciculatum (Torrey) Lelong. Various habitats, especially dry, open disturbed sites, woodlands, roadsides; throughout. P. lanuginosum var. fasciculatum (Torr.) Fern.--F,G; P. huachucae Ashe--S; P. tennesseense Ashe--S; P. lanuginosum Ell.--R, in part; Dichantherium acuminatum (Swartz) Gould & Clark var. acuminatum, in part.

32c. P. acuminatum var. unciphyllum (Trinius) Lelong. Dry to moist, open, mostly sandy woods, pinelands, disturbed sites; CPM, LPR, Hancock, Lamar and Stone Cos. P. lanuginosum var. implicatum (Scribn.) Fern.--F,G; P. lanuginosum Ell.--R, in small part; Dichantherium acuminatum var. implicatum (Scribn.) Gould & Clark; D. sabulorum (Lam.) Gould & Clark var. thinium (Hitcch. & Chase) Gould & Clark, in part.

32d. P. acuminatum var. lindheimeri (Nash) Lelong. Dry, sandy or clayey open areas, woodlands, roadsides, occasionally on moist sites; common throughout. P. lindheimeri Nash--S; P.

lanuginosum Ell--R, in part; P. lanuginosum var. lindheimeri (Nash) Fern.--F,G; Dichantherium acuminatum var. lindheimeri (Nash) Gould & Clark. This var. intergrades somewhat with var. fasciculatum and var. unciphyllum.

32e. P. acuminatum var. densiflorum (Rand & Redfield) Lelong. Wet to moist, open, sandy areas, savannahs, bogs; this predominantly n. var. occurs uncommonly in CPM, LPR, Jackson, Pearl River, Stone Cos. P. spretum Schultes--S,F,R; P. lanuginosum var. lindheimeri (Nash) Fern.--G, in part; Dichantherium acuminatum var. densiflorum Gould & Clark. This var. intergrades somewhat with var. longiligulatum more common in our range. It also suggests the more widespread var. lindheimeri occurring usually in drier habitats.

32f. P. acuminatum var. longiligulatum (Nash) Lelong. Low pinelands, pine savannahs, bogs; CPM, LPR, abundant in appropriate habitats. Harrison, Jackson, Lamar, Pearl River, Stone Cos. P. longiligulatum Nash--S,R; P. lanuginosum var. lindheimeri (Nash) Fern.--G, in part; Dichantherium acuminatum var. longiligulatum Gould & Clark.

32g. P. acuminatum var. leucothrix (Nash) Lelong. Low pinelands, pine savannahs, bogs; CPM, LPR, occurring usually with preceding var., perhaps somewhat less abundantly; CPM, LPR. P. leucothrix Nash--S,F,G,R; Dichantherium acuminatum var. implicatum Gould & Clark, in small part.

P. acuminatum is probably the most polymorphic and troublesome species in the genus. The present delimitation of recognized vars. does not fully or adequately reflect the intricate subreticulate pattern of morphological variations exhibited in this complex. The glabrous or subglabrous vars. reluctantly included in this species intergrade somewhat with the similarly polymorphic P. dichotomum. Other taxa of subg. Dichantherium apparently contribute also to the great morphological variety of this ill-defined species. Freckmann (1981) has recently proposed a slightly different treatment of taxa in the P. acuminatum complex.

33a. P. ovale Ell. var. ovale. Spikelets 2.6-3 mm long, sheaths appressed or ascending-pilose. Dry, sandy, open pine-oak woods, woodland borders; this var. occurs primarily in Fla; it has been reported for Miss. but no specimen from the State was located. Incl. P. malacon Nash--S,R, in part; P. commonsianum Ashe--F, in part; Dichantherium ovale (Ell.) var. ovale. This taxon may be confused with P. consanguineum which is much more densely pubescent throughout and occurs usually in moist pinelands and bogs.

33b. P. ovale var. pseudopubescens (Nash) Lelong. Spikelets 2.1-2.6 mm long, sheaths appressed or ascending pilose, occasionally with smaller hairs intermixed. Same dry, sandy, open habitats as var. ovale; throughout except possibly LBH and YMD. P. commonsianum Ashe--S,F,G,R; P. pseudopubescens Nash--S; P.

villosissimum Nash var. pseudopubescens Fern.--F,G; Dichantherium ovale var. addisonii (Nash) Gould & Clark.

33c. P. ovale var. villosum (A. Gray) Lelong. Spikelets 2.1-2.5 mm long, sheaths densely spreading pubescent with hairs up to 3 mm long. Same dry, sandy, open habitats as other vars.; throughout except possibly LBH and YMD. P. villosissimum Nash--S,R; P. villosissimum var. villosissimum--F,G; Dichantherium acuminatum var. villosum (A. Gray) Gould & Clark. This widespread var. grades into the more glabrous var. pseudopubescens. Occasional specimens approach long-spikelet form of P. acuminatum.

34. P. scoparium Lam. Moist to wet, open areas, often on disturbed sites, roadside ditches; common throughout. Dichantherium scoparium (Lam.) Gould. This robust plant is one of the few distinctive species of the subgenus; occasional small specimens resemble P. acuminatum var. acuminatum of which this taxon appears to be an "enlarged version."

35a. P. oligosanthos Schultes var. oligosanthos. Spikelets ellipsoid to oblong-obovoid, 3.4-4.2 mm long, usually pubescent; blades relatively long and narrow, up to 12 cm long and 8 mm wide. Dry, open, sandy pine-oak woods, clearings, woodland borders; throughout except possibly TRH and YMD. Dichantherium oligosanthos (Schultes) Gould var. oligosanthos.

35b. P. oligosanthos var. scribnerianum (Nash) Fern. Spikelets broadly obovoid to ellipsoid, 2.7-3.5 mm long, usually glabrous; blades relatively short and wide, up to 10 cm long and 13 mm wide. Dry, open, clayey, loamy or sandy areas, prairies, open woodlands; PR, NPB, Chickasaw, Lowndes and Oktibbeha Cos. P. scribnerianum Nash--S; P. oligosanthos Schultes--G,R, in part; Dichantherium oligosanthos var. scribnerianum (Nash) Gould. This predominantly midwestern var. intergrades somewhat with var. oligosanthos which occurs mostly in the Coastal Plain.

36. P. ravenelii Scribn. & Merr. Dry, sandy, open pine-oak woods; throughout except possibly YMD and LBH. Dichantherium ravenelii Gould.

37a. P. commutatum Schultes var. commutatum. Culms and sheaths usually glabrous or sparsely pubescent; blades thin, often over 10 mm wide; spikelets 2.6-3.2 mm long. Mostly shaded, mesic or low woods, hammocks, pine-oak woods, woodland borders; throughout. Incl. P. jooirii Vasey--S; P. mutabile Scribn. & J. G. Smith--S,F,G; P. commutatum var. jooirii (Vasey) Fern.--F; Dichantherium commutatum (Schultes) Gould, in large part. This var. is one of the most widespread, common and variable taxon in the subgenus.

37b. P. commutatum var. ashei Fern. Culms and sheaths densely crisp-pubescent; blades thickish, less than 10 mm wide;

spikelets 2.2-2.7 mm long. Occurring in similar habitats as preceding var. but often on more open or disturbed sites, woodland borders, roadsides; same distribution as preceding var. but less common. Coahoma, Newton, Pike and Tishomingo Cos. P. ashei Pearson--S; P. commutatum Schultes--F,G,R, in part; Dichanthelium commutatum Gould, in part. This ill-defined var. is reluctantly recognized; it may consist of an unnatural assemblage of similar forms possibly derived from occasional introgression of other species of the subgenus.

38. P. scabriusculum Ell. Wet to moist, sandy, usually open areas, stream banks, pond margins, pine savannahs, bogs, cypress-gum ponds, swamps, ditches, often in shallow water at least seasonally; CPM, LPR, also Clarke Co. Incl. P. cryptanthum Ashe--S,F; P. scabriusculum var. cryptanthum (Ash) Gleason--G; Dichanthelium scabriusculum (Ell.) Gould & Clark. Occasional weak forms of this robust grass with slender spikelets have been referred by some to P. cryptanthum; they suggest robust variants of P. dichotomum.

39. P. clandestinum L. Moist, usually sandy, open or shaded sites, low woods, stream banks, woodland borders, roadside ditches; primarily n.e. part of State, TRH, NPB, NCP. Dichanthelium clandestinum (L.) Gould. This plant approaches closely the northern P. latifolium of mesic woods; it resembles also the smaller coastal P. scabriusculum which has smaller, ovoid, glabrous spikelets.

40. P. boscii Poiret. Mesic to dryish woods, usually shady; throughout, more common northward. Incl. P. boscii var. molle (Vasey) Hitchc. & Chase--S.F; Dichanthelium boscii (Poiret) Gould & Clark. Most specimens of this widespread and variable species are more or less densely and variously pubescent; occasional glabrous specimens with shorter spikelets resemble closely the more northern P. latifolium occurring in similar habitats.

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